

Installation Instructions

Gas Conversion Kit

Propane 100% Shutoff IID-To-Natural 100% Shutoff IID
For Gas-Fired Natural-Draft Furnaces
P/N 58GSC900--031--

This instruction covers the installation of gas conversion kit P/N 58GSC900--031-- in a Model 58GSC Upflow or Model 58DRC Downflow Natural-Draft Furnace with the BDP 646A or the White-Rodgers 36E Gas Valve. The kit can be used to convert propane gas 100% shutoff IID controls to natural 100% shutoff IID. It is designed for use in furnaces with 30,000- thru 100,000-Btuh nominal output capacity. These furnaces are to be installed only within California.

NOTE: The definition of 100% shutoff refers to automatic shutoff of the pilot and main burner gas when the ignition source is not proven.

NOTE: Read the entire instructions before starting the installation. There are additional parts shipped in the kit. When the installation is complete, discard the unused parts.

⚠ CAUTION

Do not use this kit to convert 58DR and 58GS units to natural gas applications.

⚠ WARNING

Improper installation, adjustment, alteration, service, maintenance, or use can cause carbon monoxide poisoning, explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, local gas supplier, or your Distributor or Branch for information or assistance. The qualified installer or agency must use only factory-authorized kits or accessories when modifying this product.

New NO_x burners must be installed along with this kit. The burners are not supplied with the kit. Order the required number of burners for the furnace being converted. Order burner P/N 309472-751.

This kit contains the following items:

Table 1—Kit Contents

DESCRIPTION	P/N	QTY
Natural Conversion Kit—Regulator Spring for White-Rodgers 36E Gas Valve (Silver, 10 Turns)	EF39ZW037	1
Natural Regulator Spring for BDP 646A Gas Valve (Silver, 3-In. Long)	301248-101	1
Pilot Orifice (Silver, 1/2-In. Long, 0.018-In. Orifice Diameter)	307123-701	1
Main Burner Orifice No. 45	LH32DB205	6
Gas Control Conversion Label	310148-302	1
Conversion Responsibility Label	310167-312	1
Conversion Rating Plate	310168-312	1
Installation Instructions	58D, G-2SI	1

⚠ WARNING

This conversion kit is to be installed by a Carrier factory-authorized Dealer, Distributor, or other qualified agency in accordance with the manufacturer's instructions and all codes and requirements of the authority having jurisdiction. A failure to follow instructions could result in serious injury or property damage. The qualified agency performing this work assumes responsibility for this conversion.

A. Installation of Pilot Orifice

1. Turn off gas and electric supplies to furnace.
2. Remove control access door.
3. Disconnect pilot gas tube from gas valve.
4. Unplug electrode wire from spark generator.
5. Remove pilot assembly from burner and furnace.
6. Using backup wrench, remove gas supply tube from pilot.
7. Remove and discard propane gas pilot orifice (silver, 5/8-in. long, 0.012-in. diameter orifice, knurl end) from gas supply opening of pilot.

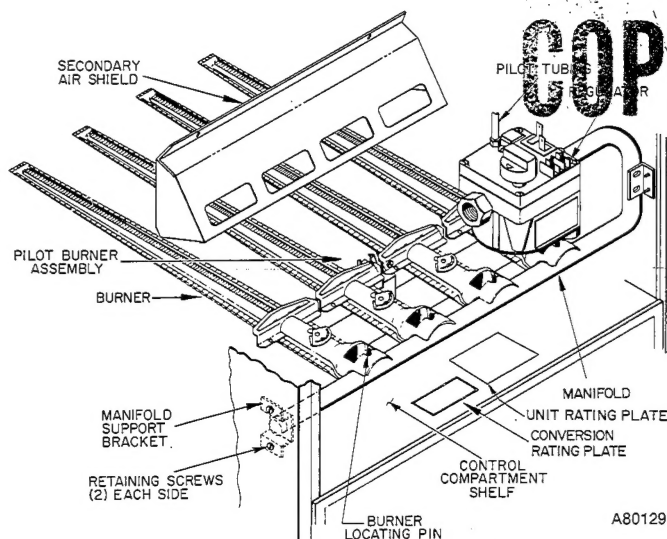


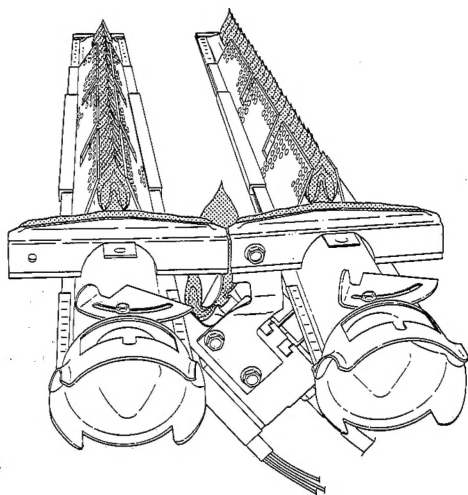
Fig. 1—Gas Controls

8. Install new natural gas pilot orifice (silver, 1/2-in. long, 0.018-in. orifice diameter).
9. Reinstall pilot gas supply tube on pilot. When tightening pilot tube, use backup wrench and turn pilot so that it will be on the same angle as before. **Do not** reinstall pilot at this time.

B. Installation of Main Burner Orifices

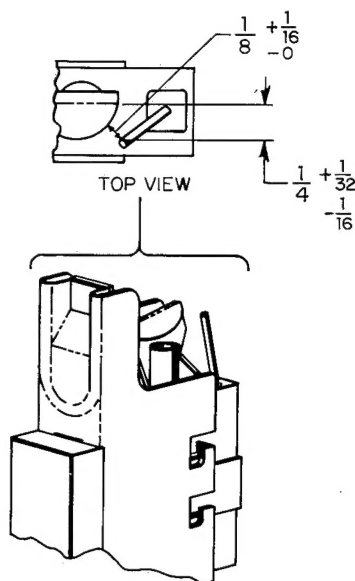
1. Remove secondary air shield.
2. Remove main burners from manifold.
3. Remove and discard No. 55 (or field-installed per local application) orifices from manifold.
4. Install No. 45 main burner orifices provided in kit. Finger-tighten orifices at least one full turn so as not to cross-thread, then tighten with wrench. There are enough orifices in each kit for the largest furnace. Discard extra orifices.

The full input rating with No. 45 main burner natural gas orifices is approved for altitudes up to 2000 ft. The input rating for altitudes above 2000 ft must be reduced by 4% for each 1000 ft above sea level. Consult the current edition of the National Fuel Gas Code NFPA No. 54/ANSI Z223.1, Part 8.1 and Appendix F Table F-4, for input adjustment for high altitude.



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Fig. 2—Pilot/Burner Relationship



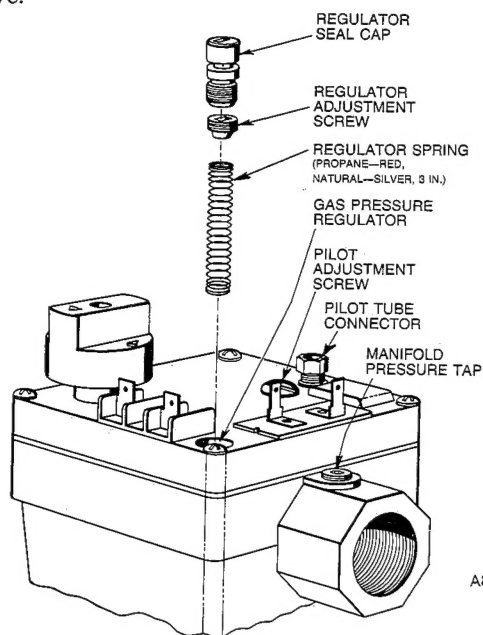
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Fig. 3—Position of Pilot Electrode to Pilot

5. Install new burners with NO_x reduction screens on manifold. See Figs. 2 and 3 for proper orientation of burners and pilot.
6. Reinstall pilot assembly.
7. Reconnect pilot supply tube to gas valve.
8. Reconnect electrode wire to spark generator.
9. Reinstall secondary air shield.

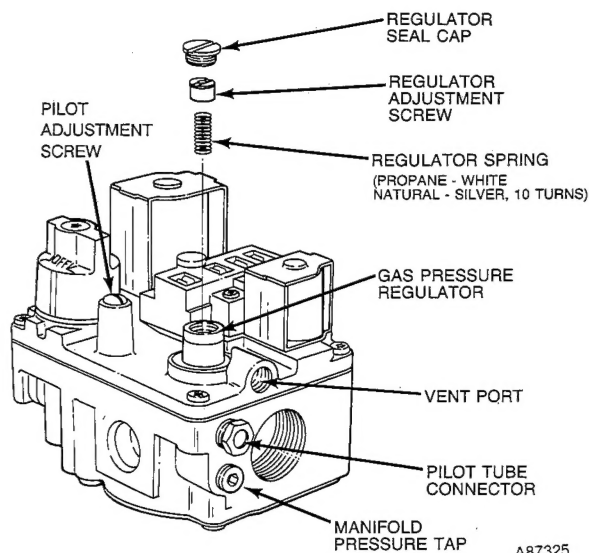
C. Conversion of Gas Valve and Inlet Gas Pressure Check

1. Remove regulator seal cap. See Fig. 4 for BDP 646A or Fig. 5 for White-Rodgers 36E Gas Valve.
2. Remove adjustment screw and propane gas regulator spring (red for 646A and white for 36E).
3. Install proper natural gas regulator spring (silver) provided in kit, in proper gas valve. See Table 1.
4. Replace regulator adjustment screw. **Do not** reinstall regulator seal cap at this time.
5. Remove 1/8-in. pipe plug from inlet pressure tap on gas valve.



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Fig. 4—BDP Model 646A Gas Valve



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Fig. 5—White-Rodgers Model 36E Gas Valve

6. Check inlet natural gas pressure.

NOTE: This kit is to be used only when inlet gas pressure is between 4.5- and 13.6-ins. wc.

- a. Attach manometer at inlet pressure tap on gas supply side of furnace gas valve.

⚠ CAUTION

Do not operate furnace more than one minute to check inlet gas pressure as conversion is not complete at this time.

- b. Set room thermostat "call for heat."
- c. Turn gas supply manual shut-off valve on.
- d. Turn furnace gas valve control knob to ON.
- e. Turn electrical supply to ON.
- f. When main burners have ignited, confirm proper inlet gas pressure.
- g. Turn furnace gas valve control knob to OFF.
- h. Turn gas supply manual shut-off valve off.
- i. Turn electric supply to furnace to OFF.
- j. Remove manometer and replace plug in pressure tap.

NOTE: Use propane gas-resistant pipe dope. Do not use Teflon tape.

7. Attach gas control conversion label P/N 310148-302 to cell panel.
8. Attach conversion rating plate P/N 310168-312 near existing rating plate. See Fig. 1.

D. Check Furnace Operation and Make Necessary Adjustments

1. Be sure main gas and electric supplies to furnace are off.
2. Attach manometer at manifold pressure tap on downstream side of gas valve.
3. Set room thermostat to "call for heat."

⚠ WARNING

Never use a match or other open flame to check for leaks. Use a soap-and-water solution. A failure to heed this warning could result in personal injury or death.

4. Turn gas supply manual shut-off valve on and check inlet pressure tap plug for leaks.
5. Turn furnace gas valve control knob to ON and check all threaded pipe connections for gas leaks.
6. Turn on electrical supply.
7. When pilot ignites, check pilot gas-supply tube connections for leaks. When main burners ignite, check manifold orifices for gas leaks.
8. Determine gas input:
 - a. Turn off all other gas appliances and pilots.
 - b. Measure time (in seconds) for gas meter test dial to complete one revolution.
 - c. Refer to Table 2 for cubic ft of gas per hour.
 - d. Multiply cubic ft/hour by Btu cubic ft. Obtain heating value from local gas utility.

NOTE: Be sure heating value of gas used for calculations is correct for your altitude. Consult local gas utility for altitude adjustment of gas heating value.

High altitude:

The full input rating with No. 45 main burner natural gas orifices is approved for altitudes up to 2000 ft. The input rating for altitudes above 2000 ft must be reduced by 4% for each 1000 ft above sea level. Consult the current edition of the National Fuel Gas Code NFPA No. 54/ANSI Z223.1, Part 8.1 and Appendix F Table F-4, for input adjustment for high altitude.

- e. Refer to unit rating plate for gas input rate. The measured input must be within 2 percent of the rating plate input.

EXAMPLE:

Btuh heating input = Btu/cubic ft times cubic ft/hour

Heating value of gas = 1070 Btu/cubic ft.

Time for one revolution of 2-cubic-ft dial = 72 seconds

Gas rate = 100 cubic ft/hour (from Table 2)

Btu heating input = 1070 x 100 = 107,000 Btuh

9. To adjust input rate:

- a. Remove cap that conceals adjustment screw for gas valve regulator.
- b. Turn adjustment screw either counterclockwise (out) to decrease input or clockwise (in) to increase rate. When adjusting input rate, do not set manifold pressure above 3.8 or below 3.2-ins. wc. Make any major adjustments by changing main burner orifices.

Table 2—Gas Rate (Cubic Ft/Hour)

Seconds for One Revolution	SIZE OF TEST DIAL			Seconds for One Revolution	SIZE OF TEST DIAL		
	1 cu ft	2 cu ft	5 cu ft		1 cu ft	2 cu ft	5 cu ft
10	360	720	1800	50	72	144	360
11	327	655	1636	51	71	141	355
12	300	600	1500	52	69	138	346
13	277	555	1385	53	68	136	340
14	257	514	1286	54	67	133	333
15	240	480	1200	55	65	131	327
16	225	450	1125	56	64	129	321
17	212	424	1059	57	63	126	316
18	200	400	1000	58	62	124	310
19	189	379	947	59	61	122	305
20	180	360	900	60	60	120	300
21	171	343	857	62	58	116	290
22	164	327	818	64	56	112	281
23	157	313	783	66	54	109	273
24	150	300	750	68	53	106	265
25	144	288	720	70	51	103	257
26	138	277	692	72	50	100	250
27	133	267	667	74	48	97	243
28	129	257	643	76	47	95	237
29	124	248	621	78	46	92	231
30	120	240	600	80	45	90	225
31	116	232	581	82	44	88	220
32	113	225	563	84	43	86	214
33	109	218	545	86	42	84	209
34	106	212	529	88	41	82	205
35	103	206	514	90	40	80	200
36	100	200	500	92	39	78	196
37	97	195	486	94	38	76	192
38	95	189	474	96	38	75	188
39	92	185	462	98	37	74	184
40	90	180	450	100	36	72	180
41	88	176	439	102	35	71	178
42	86	172	429	104	35	69	173
43	84	167	419	106	34	68	170
44	82	164	409	108	33	67	167
45	80	160	400	110	33	65	164
46	78	157	391	112	32	64	161
47	76	153	383	116	31	62	155
48	75	150	375	120	30	60	150
49	73	147	367				

- c. Measure adjusted gas input rate using method outlined in step 8.
 - d. Replace regulator adjustment screw seal cap.
 10. Inspect burner and pilot flame. The main burner flame should be clear blue, almost transparent. The pilot flame should be soft blue in color and it must provide good impingement on the pilot-sensing element. The flame should extend above the burner carryover port to provide proper burner ignition. See Figs. 2 and 3. When the pilot flame requires adjustment:
 - a. Locate adjustment screw marked PILOT ADJ on top of gas valve. See Figs. 4 and 5.
 - b. Remove cap and turn adjustment screw clockwise to decrease pilot gas flow. Turn screw counter-clockwise to increase pilot gas flow.
 - c. When proper adjustment is obtained, replace screw cap.
 11. Turn furnace gas valve control knob to OFF.
 12. Remove manometer and replace manifold pressure tap plug.
 13. Turn furnace gas valve control knob to ON.
 14. With main burners ignited, check pressure tap plugs for gas leaks.
- E. Check Lockout Timer Module (LOD) Operation**
1. Turn off electrical supply.
 2. With furnace off, remove wire from terminal No. 5 of gas valve.
 3. Set room thermostat to "call for heat."
 4. Turn on electrical supply.
 5. Let pilot spark until lockout timer breaks spark generator circuit (approximately 5 minutes).
 6. Replace wire on terminal No. 5 of gas valve.
 7. Electrically reset lockout timer by setting room thermostat below room temperature for approximately 30 seconds.
 8. Sign and date conversion label P/N 310167-312 provided in kit, and attach to outside of blower compartment door.
 9. Replace control access door.
 10. Reset room thermostat to desired temperature.
- During normal operation, if the pilot flame is not proven within approximately 5 minutes, the lockout timer opens, deenergizing the gas valve, and stopping the gas flow to the pilot. The lockout timer will remain open until it is electrically reset.